

Listing of the Claims:

This following listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (Currently Amended): A reaction vessel that is elongated substantially along a substantially vertical axis, comprising at least two stages in the vertical direction, in which at least one endothermic or exothermic catalytic reaction is carried out, comprising:

- at least one catalytic reaction zone (12a, 12b) per stage (6, 7) and extending substantially along the axis of the vessel;
- means (2) for introducing at least one reaction fluid to a stage adapted for substantially transverse fluid movement over substantially the whole vertical extent of the reaction zone;
- means for introducing catalyst into the reaction zone and means for extracting catalyst from the reaction zone;
- at least one means (5a) for heat exchange with the reaction fluids, located inside the vessel between two successive reaction zones;
- means (6) for transporting reaction fluids from one stage to another connected firstly to a heat exchange means and secondly to the reaction zone; and
- means for recovering reaction fluids downstream of the last stage;

wherein the thickness of each reaction zone being determined to limit the variation in temperature in said zone and the heat exchange means being adapted to adjust the temperature of the reaction fluids entering the reaction zone to a level substantially at most equal to that of the temperature of the reaction fluids entering the preceding zone, and

in which the catalyst is in the form of a moving bed, with substantially gravitational flow, the reaction zone or zones of one stage being connected to that/those of a lower stage via at least one passage with cross section (S1) that is reduced with respect to the cross section (S2) of the reaction zone, the reaction zone or zones of the first stage comprising means for introducing catalyst and the reaction zone or zones of the final stage comprising catalyst extraction means, said extraction means comprising a means for adjusting and controlling the rate of catalyst flow.

Claim 2 (Cancelled):

Claim 3 (Cancelled):

Claim 4 (Currently Amended): A reaction vessel according to claim 1, comprising means for moving the catalyst and reaction fluids in a generally co-current motion along the axis of the vessel.

Claim 5 (Previously Presented): A reaction vessel according to claim 1, comprising at least two stages (6, 7) and at least two reaction zones (12a, 12d) per stage.

Claim 6 (Previously Presented): A reaction vessel according to claim 1, comprising three to twelve reaction zones, limits included.

Claim 7 (Previously Presented): A reaction vessel according to claim 1, wherein at least one of the reaction zones has a substantially planar cross section.

Claim 8 (Previously Presented): A reaction vessel according to claim 1, wherein at least one of the reaction zones has a substantially annular cross section.

Claim 9 (Previously Presented): A reaction vessel according to claim 1, wherein at least one of the reaction zones has a substantially elliptical cross section.

Claim 10 (Previously Presented): A reaction vessel according to claim 1, comprising downstream of the heat exchange means in the direction of motion of the reaction fluids, at least one means (304, 804, 805) for mixing of the reaction fluids from the heat exchange means prior to their introduction into the reaction zone located downstream of said heat exchange means.

Claim 11 (Previously Presented): A reaction vessel according to claim 1, wherein the means for transporting reaction fluids from one stage to the lower stage are disposed substantially in the proximity of the central axis of the vessel.

Claim 12 (Previously Presented): A reaction vessel according to claim 1, further comprising a means (616) placed substantially at the centre of at least one stage for separating the reaction fluids into a plurality of streams, each stream then separately traversing a succession of reaction zones (606, 605, 604; 601, 602, 603) and heat exchange means (613, 614, 615; 611, 612, 615) within that stage.

Claim 13 (Previously Presented): A reaction vessel according to claim 1, wherein at least one of the heat exchange means comprises a series of finned tubes, the reaction fluids moving externally of said tubes.

Claim 14 (Previously Presented): A reaction vessel according to claim 1, wherein at least a portion of said heat exchange means is disposed between two successive stages.

Claims 15-25 (Cancelled):

Claim 26 (Previously Presented): A reaction vessel according to claim 2, comprising at least two stages (6, 7) and at least two reaction zones (12a, 12d) per stage.

Claim 27 (Currently Amended): A reaction vessel according to claim 7 3, comprising at least two stages (6, 7) and at least two reaction zones (12a, 12d) per stage.

Claim 28 (Previously Presented): A reaction vessel according to claim 4, comprising at least two

stages (6, 7) and at least two reaction zones (12a, 12d) per stage.

Claim 29 (Previously Presented): A reaction vessel according to claim 2, comprising three to twelve reaction zones, limits included.

Claim 30 (Currently Amended): A reaction vessel according to claim 7 ~~3~~, comprising three to twelve reaction zones, limits included.

Claim 31 (Previously Presented): A reaction vessel according to claim 4, comprising three to twelve reaction zones, limits included.

Claim 32 (Previously Presented): A reaction vessel according to claim 5, comprising three to twelve reaction zones, limits included.

Claim 33 (Currently Amended): A reaction vessel according to claim 4 ~~3~~, comprising downstream of the heat exchange means in the direction of motion of the reaction fluids, at least one means (304, 804, 805) for mixing of the reaction fluids from the heat exchange means prior to their introduction into the reaction zone located downstream of said heat exchange means.

Claim 34 (Currently Amended): A reaction vessel according to claim 5 ~~27~~, comprising downstream of the heat exchange means in the direction of motion of the reaction fluids, at least one means (304, 804, 805) for mixing of the reaction fluids from the heat exchange means prior to their introduction into the reaction zone located downstream of said heat exchange means.

Claim 35 (Previously Presented): A reaction vessel according to claim 30, comprising downstream of the heat exchange means in the direction of motion of the reaction fluids, at least one means (304, 804, 805) for mixing of the reaction fluids from the heat exchange means prior

to their introduction into the reaction zone located downstream of said heat exchange means.

Claim 36 (Previously Presented): A reaction vessel according to claim 10, wherein at least one of the heat exchange means comprises a series of finned tubes, the reaction fluids moving externally of said tubes.

Claim 37 (Previously Presented): A reaction vessel according to claim 11, wherein at least one of the heat exchange means comprises a series of finned tubes, the reaction fluids moving externally of said tubes.

Claim 38 (Previously Presented): A reaction vessel according to claim 12, wherein at least one of the heat exchange means comprises a series of finned tubes, the reaction fluids moving externally of said tubes.

Claim 39 (Previously Presented): A reaction vessel according to claim 10, wherein at least a portion of said heat exchange means is disposed between two successive stages.

Claim 40 (Previously Presented): A reaction vessel according to claim 11, wherein at least a portion of said heat exchange means is disposed between two successive stages.

Claim 41 (Previously Presented): A reaction vessel according to claim 12, wherein at least a portion of said heat exchange means is disposed between two successive stages.

Claim 42 (Previously Presented): A reaction vessel according to claim 13, wherein at least a portion of said heat exchange means is disposed between two successive stages.

Claim 43 (Currently Amended): A reaction vessel according to claim 7 14, wherein at least a portion of said heat exchange means is disposed between two successive stages.

Claim 44 (Currently Amended): A reaction vessel according to claim 4 3, wherein the means for transporting reaction fluids from one stage to the lower stage are disposed substantially in the proximity of the central axis of the vessel.

Claim 45 (Currently Amended): A reaction vessel according to claim 4 3, wherein at least one of the heat exchange means comprises a series of finned tubes, the reaction fluids moving externally of said tubes.

Claim 46 (Currently Amended): A reaction vessel according to claim 4 3, wherein at least a portion of said heat exchange means is disposed between two successive stages.

Claim 47 (Previously Presented): A reaction vessel according to claim 1, containing at least one of linear paraffins containing 3 to 30 carbon atoms and monolefinic reaction products thereof.

Claim 48 (New): A reaction vessel that is elongated substantially along a substantially vertical axis, comprising at least two stages in the vertical direction, in which at least one endothermic or exothermic catalytic reaction is carried out, comprising:

- at least one catalytic reaction zone (12a, 12b) per stage (6, 7) and extending substantially along the axis of the vessel;
- means (2) for introducing at least one reaction fluid to a stage adapted for substantially transverse fluid movement over substantially the whole vertical extent of the reaction zone;
- means for introducing catalyst into the reaction zone and means for extracting catalyst from the reaction zone;
- at least one means (5a) for heat exchange with the reaction fluids, located inside the vessel between two successive reaction zones;
- means (6) for transporting reaction fluids from one stage to another connected firstly to a heat exchange means and secondly to the reaction zone; and

- means for recovering reaction fluids downstream of the last stage;

wherein the thickness of each reaction zone being determined to limit the variation in temperature in said zone and the heat exchange means being adapted to adjust the temperature of the reaction fluids entering the reaction zone to a level substantially at most equal to that of the temperature of the reaction fluids entering the preceding zone, and

in which the catalyst is in the form of a moving bed, with substantially gravitational flow, the reaction zone or zones of one stage being connected to that/those of a lower stage via at least one passage with cross section (S1) that is reduced with respect to the cross section (S2) of the reaction zone.

Claim 49 (New): A reaction vessel that is elongated substantially along a substantially vertical axis, comprising at least two stages in the vertical direction, in which at least one endothermic or exothermic catalytic reaction is carried out, comprising:

- at least one catalytic reaction zone (12a, 12b) per stage (6, 7) and extending substantially along the axis of the vessel;
- means (2) for introducing at least one reaction fluid to a stage adapted for substantially transverse fluid movement over substantially the whole vertical extent of the reaction zone;
- means for introducing catalyst into the reaction zone and means for extracting catalyst from the reaction zone;
- at least one means (5a) for heat exchange with the reaction fluids, located inside the vessel between two successive reaction zones;
- means (6) for transporting reaction fluids from one stage to another connected firstly to a heat exchange means and secondly to the reaction zone; and
- means for recovering reaction fluids downstream of the last stage;

wherein the catalyst is in the form of a moving bed, with substantially gravitational flow, the reaction zone or zones of one stage being connected to that/those of a lower stage via at least one passage with cross section (S1) that is reduced with respect to the cross section (S2) of the reaction zone.